
Lunar Strategic Roadmap Committee
Meeting #1
January 24-25, 2005
Space Center Houston
Rear Admiral Craig E. Steidle (Ret.)
Associate Administrator
Exploration Systems Mission Directorate

Agenda - January 24, 2005

8:30	**Meeting Opening:**	
	-Call to Order	**Scott Wilson**
	-Introduction of committee members	**Members**
	-Strategic Roadmapping Process	**Marc Allen**
	-Objective/charter/expectations/Vision	**Admiral Craig Steidle**
10:00	***Session 1: Background Briefings***	
	-Status of Lunar Robotic Missions / Precursors	**Jim Garvin**
	-Current Status of Lunar Architecture Analysis	**Dr. Michael Lembeck**
	-Lunar Exploration Analysis Group (LEAG) Debrief	**Dr. Jeff Taylor**
12:00	**Working Lunch**	
	-FACA Briefing	**Diane Rausch**
	-Ethics Briefing	**Andrew Falcon**
1:00	***Session 2: Special Topics in Lunar Exploration***	
	-International Participation in Exploration Lunar	**Gib Kirkham**
	-In-situ Resource Utilization	**Gerald Sanders**
2:30	***Session 3: Moon Mars Linkages***	
	-Mars Strategic Roadmap First Meeting Debrief	**Dr. Firouz Naderi**
	-The Moon as a Test-bed for Mars	**Bret Drake**
	-MEPAG Lunar-Mars Science Linkages Study	**Chip Shearer**
4:00	**Committee Discussion**	**Members**
5:00	**Adjourn for the day**	**Scott Wilson**
7:00	**Dinner**	**Committee and Staff**

Agenda - January 25, 2005

8:00	**Continental Breakfast**	
8:30	***Session 4: Strawman Roadmap***	
	-Strawman Robotic Architecture	**Jim Garvin**
	-Committee Discussion on presented subject	**Co-Chairs and Members**
	-Strawman Human Lunar Goals and Objectives	**Doug Cooke**
	-Committee Discussion on presented subject	**Co-Chairs and Members**
	-Roadmap Alternatives and Key Questions	**Kent Joosten**
	-Committee Discussion on presented subject	**Co-Chairs and Members**
12:00	**Working Lunch**	**All**
1:30	**Committee Discussion (continued)**	**Co-Chairs and Members**
3:00	**Reports on Request For Information (RFI) Responses**	**TBD**
4:00	**Preparation for next meeting**	**Co-Chairs and Members**
5:00	**Adjourn**	**Scott Wilson**

Starting with President's Vision for Space Exploration as the foundation, this committee is chartered to fill the strategy gap for the Moon.

- Prioritizing lunar exploration objectives => the WHAT we are doing on the Moon
- Defining lunar roadmap alternatives => the approaches to HOW & WHEN

Committee's product serves two purposes:

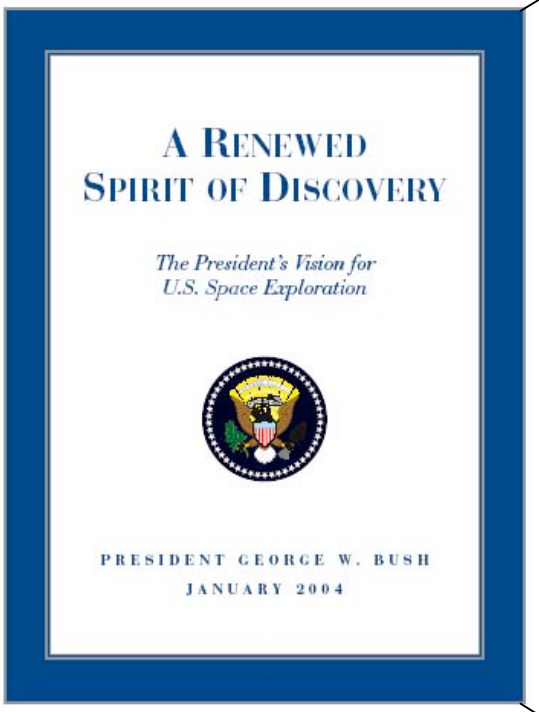
1) Answers Agency's need for strategic planning
   - **This roadmap, integrated with other key roadmaps (Mars, Transportation, etc), will form the basis for the Agency's program priorities and investments.**

AND

2) Provides key input to ESMD's processes and analyses
   - **This lunar strategy will inform the ultimate exploration missions and systems currently under definition by the Exploration Systems Mission Directorate (ESMD).**

The Vision for Space Exploration

THE FUNDAMENTAL GOAL OF THIS VISION IS TO ADVANCE U.S. SCIENTIFIC, SECURITY, AND ECONOMIC INTEREST THROUGH A ROBUST SPACE EXPLORATION PROGRAM

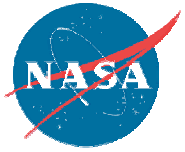


Implement a <u>sustained</u> and <u>affordable</u> human and robotic program to explore the solar system and beyond

<u>Extend human presence across the solar system</u>, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;

<u>Develop the innovative technologies</u>, <u>knowledge</u>, and <u>infrastructures</u> both to explore and to support decisions about the destinations for human exploration; and

Promote <u>international and commercial participation</u> in exploration to further U.S. scientific, security, and economic interests.



Realizing the Future

Earth, Moon, Mars, and Beyond

Foster and sustain the exploration culture across generations

- Open new frontiers
- Continuing and inspiring
- A constant impetus to educate and train

Identify, develop, and apply advanced technologies to…

- Enable exploration and discovery
- Allow the public to actively participate in the journey
- Translate the benefits of these technologies to improve life on Earth

Harness the brain power

- Engage the nation's science and engineering assets
- Motivate successive generations of students to pursue science, math, engineering and technology
- Create the tools to facilitate broad national technical participation

International Cooperation

- Promote common objectives and cooperative/complementary efforts for space exploration
- Utilize international capabilities to help close capability gaps and develop breakthrough technologies

Vision for Space Exploration
Key Presidential Direction

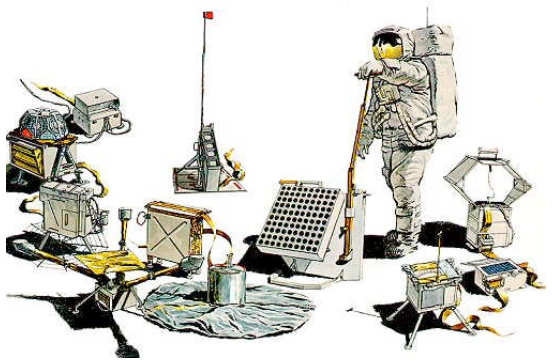
1. Return the Shuttle to safe flight as soon as practical, based on CAIB recommendations
2. Use Shuttle to complete ISS assembly
3. Retire the Shuttle after assembly complete (2010 target)
4. *Focus ISS research to support exploration goals; understanding space environment and countermeasures*
5. Meet foreign commitments
6. ***Undertake lunar exploration to support sustained human and robotic exploration of Mars and beyond***
7. ***Series of robotic missions to Moon by 2008 to prepare for human exploration***
8. ***Expedition to lunar surface as early as 2015 but no later than 2020***
9. ***Use lunar activities to further science, and test approaches (including lunar resources) for exploration to Mars & beyond***
10. *Conduct robotic exploration of Mars to prepare for future expedition*
11. *Conduct robotic exploration across solar system to search for life, understand history of universe, search for resources*
12. *Conduct advanced telescope searches for habitable environments around other stars*
13. *Demonstrate power, propulsion, life support capabilities for long duration, more distant human and robotic missions*
14. *Conduct human expeditions to Mars after acquiring adequate knowledge and capability demonstrations*
15. *Develop a new Crew Exploration Vehicle; flight test before end of decade; human exploration capability by 2014*
16. *Separate cargo from crew as soon as practical to support ISS; acquire crew transport to ISS after Shuttle retirement*
17. *Pursue international participation*
18. *Pursue commercial opportunity for transportation and other services*

Objectives

- Implement a sustained and affordable human and robotic program
- Extend human presence across the solar system and beyond
- Develop supporting innovative technologies, knowledge, and infrastructures
- Promote international and commercial participation in exploration

Major Milestones

- 2008: Initial flight test of CEV
- 2008: Launch first lunar robotic orbiter
- 2009-2010: Robotic mission to lunar surface
- 2011: First uncrewed CEV flight
- 2014: First crewed CEV flight
- 2015–2020: First human mission to the Moon



Implementing the Vision for Space Exploration…

One Step at a Time

New Way of Doing Business Enables Affordability & Sustainability

- Spiral Development employs technology to enable each successive step
  - Focused on System-of-Systems needed for Exploration
  - Paced by experience, technology readiness and flexibility
- Implement Strategy-to-Task-to-Technology Process
  - Requirements-driven technology investment
- Employ innovative acquisition strategies
  - Commercial Service Providers, Data buys
  - Government/industry partnerships
  - International participation
- Rigorous acquisition strategy and execution
  - Management rigor
  - Consistency of purpose
  - Disciplined processes

Use the Vision to Transform NASA

- Focus Agency on a long term space vision
- Employ an integrated agency approach
- Leverage talent, experience and leadership – recent successes and demonstrated management reforms
- Maintain passion and commitment to succeed

Vision Requires System-of-Systems Integration

Cross-Agency Coordination & Integration

Transit and Launch Systems

Crew Transport

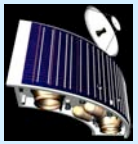
Launch

Crew Support

The Human: an Essential Element of the System of Systems

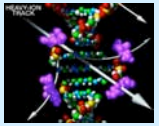
Surface and Orbital Systems

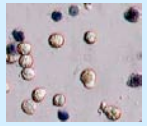
Landing Systems



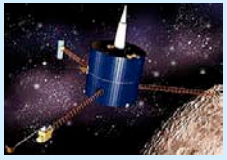
Comm/Nav

Surface Mobility





Biomedical Countermeasures and Limits



Resource Identification and Characterization

Supporting Research

Long-Duration Habitation

Pre-Positioned Propellants

Surface Power and Resource Utilization

Technology Options

Mars Candidates

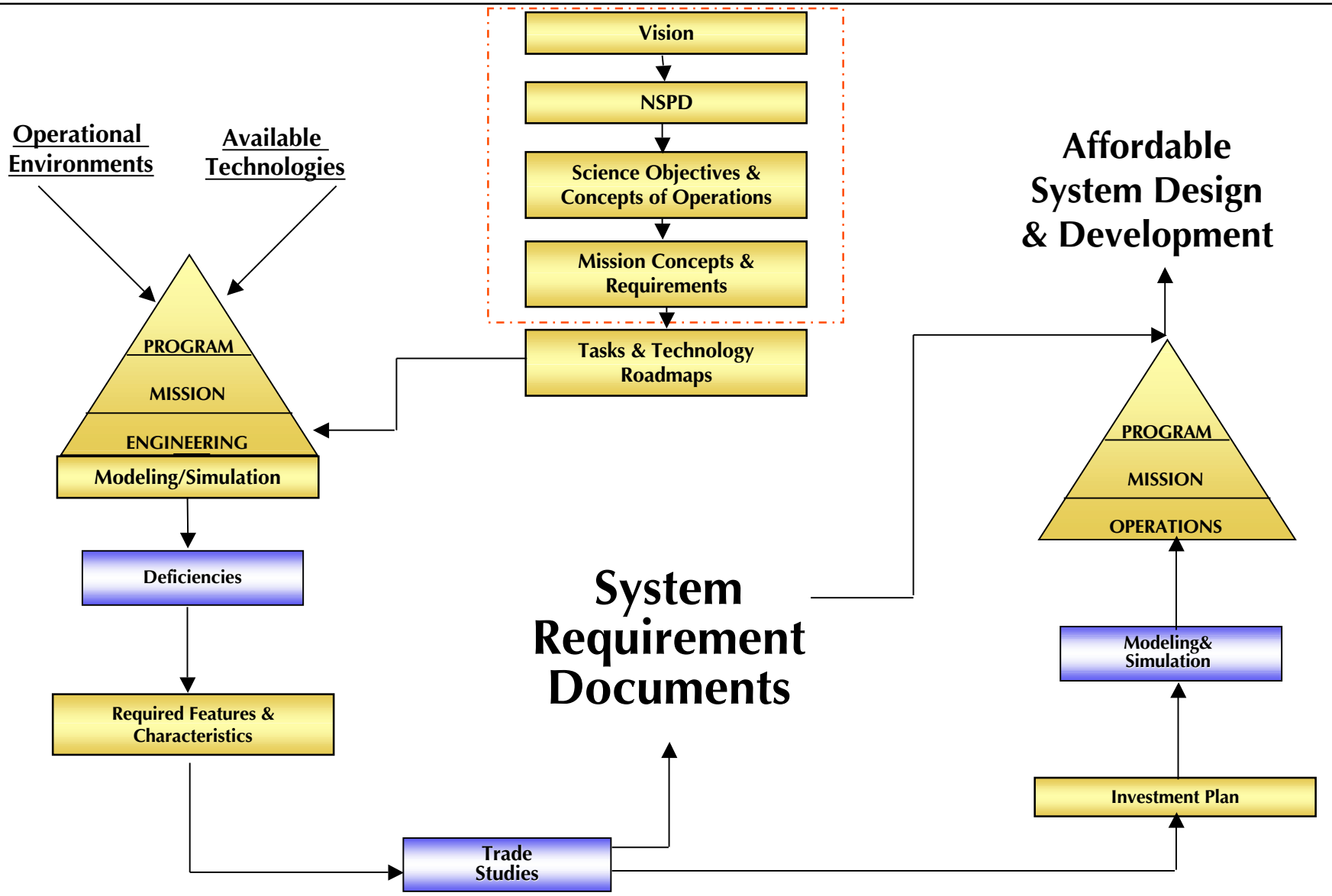
Telescope Candidates

Outer Moons Candidates

Commonality/Evolvability For Future Missions

Developing Requirements and an Investment Plan

Strategy-to-Task-to-Technology Process



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Lunar Strategic Roadmap Focus:

Conduct robotic and human lunar expeditions to further science and to test new exploration approaches, technologies, and systems that will enable future human exploration of Mars.


We're not where we want to be,
We're not where we're going to be,
BUT we're certainly not where we were yesterday.